

Interest Rates and Monetary Policy

Chapter 33 is the third chapter dealing with money and banking. It explains how the Federal Reserve affects output, income, employment, and the price level of the economy. Central bank policy designed to affect these variables is called **monetary policy**, the goal of which is price-level stability, full employment, and economic growth.

The work of the Fed focuses on the interest rate and supply and demand in the market for money. The total **demand for money** is made up of a **transactions demand** and an **asset demand** for money. Because money is used as a medium of exchange, consumers and business firms wish to hold money for transaction purposes. The quantity of money they demand for this purpose is directly related to the size of the economy's nominal GDP.

Money also is used as a store of value that creates an asset demand. Consumers and businesses who own assets may choose to have some of their assets in the form of money (rather than in stocks, bonds, goods, or property). Holding money, however, imposes a cost on those who hold it. This cost is the interest they lose when they own money rather than an interest-earning asset such as a bond. Consumers and businesses will demand less money for asset purposes when the rate of interest (the cost of holding money) is high and demand more money when the rate of interest is low; the quantity of money demanded as an asset is inversely related to the interest rate.

The total demand for money is the sum of the transactions demand and the asset demand. It is affected by both nominal GDP and the rate of interest. The total demand and the supply of money determine interest rates in the market for money. The inverse relationship between bond prices and interest rates helps this market adjust to shortages or surpluses of money.

The chapter explains how the Federal Reserve achieves its basic goal. In this discussion, attention should be paid to the following: (1) the important items on the balance sheet of the Federal Reserve Banks; and (2) the four major controls available to the Federal Reserve, and how the employment of these controls can affect the reserves, excess reserves, actual money supply, and money-creating potential of the banking system. The most important control is the buying and selling of government securities in the open market.

The Federal Reserve targets the Federal funds rate because it is the interest rate it can best control. This rate is the interest rate that banks charge each other on overnight loans of temporary excess reserves. The Federal Reserve uses open-market operations to sell government securities and this increases the excess reserves of banks, thus lowering the Federal funds rate. In this case, the Federal

Reserve is pursuing an expansionary monetary policy that increases the money supply and decreases interest rates. Conversely, the Federal Reserve can buy government securities and decrease excess reserves, and thus raise the Federal funds rate. In this case, the Federal Reserve is pursuing a restrictive monetary policy that decreases the money supply and increases interest rates.

Professors McConnell and Brue follow the discussion of the Federal funds rate with an explanation of how changes in the money supply ultimately affect the economy. They achieve this objective by describing how the demand for money and the supply of money determine the interest rate (in the market for money), and how the interest rate and the investment demand schedule determine the level of equilibrium GDP. The effects of an expansionary monetary policy or a restrictive monetary policy in this cause-effect chain are illustrated with examples and summarized in Table 33.3. Changes in monetary policy shift aggregate demand across the aggregate supply curve, thus changing real output and the price level.

One of the concluding sections of the chapter evaluates monetary policy. The major strengths are related to its speed and flexibility and isolation from political pressures. The Federal Reserve has had many successes since the 1990s in countering recession by lowering the interest rate and in controlling inflation by raising the interest rate.

Monetary policy, however, is not without its problems or complications. There can be lags between the time actions are taken and the time the monetary policy influences economic activity. Monetary policy also can suffer from cyclical asymmetry by being more influential in controlling inflation than in preventing recession. There have been debates about whether there should be more or less discretion in the conduct of monetary policy and the adoption of inflation targeting.

The final section on the "Big Picture" is short but important. Figure 33.6 gives you an overview of the economic factors and government policies that affect aggregate demand and aggregate supply. It summarizes much of the economic theory and policy that have been discussed in this chapter and the eight chapters that preceded it.

■ CHECKLIST

When you have studied this chapter you should be able to

- ☐ Explain what interest is and why it is important.
- ☐ Give a definition of the transactions demand for money.

- ☐ Give a definition of the asset demand for money.
- ☐ Illustrate graphically how the transactions and asset demands for money combine to form the total demand for money.
- ☐ Describe the market for money and what determines the equilibrium rate of interest.
- ☐ Explain how changes in nominal GDP and in the money supply affect the interest rate.
- ☐ Illustrate with an example how disequilibrium in the market for money is corrected through changes in bond prices.
- ☐ List the important assets and liabilities of the Federal Reserve Banks.
- ☐ Identify the four tools of monetary policy.
- ☐ Explain how the Federal Reserve can expand the money supply by buying government securities from commercial banks and from the public.
- ☐ Explain how the Federal Reserve can contract the money supply by selling government securities to commercial banks and to the public.
- ☐ Describe how raising or lowering the reserve ratio can increase or decrease the money supply.
- ☐ Illustrate how raising or lowering the discount rate can increase or decrease the money supply.
- ☐ Explain how the Federal Reserve uses the term auction facility to alter bank reserves and bank lending.
- ☐ Discuss the relative importance of monetary policy tools.
- ☐ Explain how the Federal Reserve uses monetary policy to target the Federal funds rate.
- ☐ Describe the actions the Fed can take to pursue an expansionary monetary policy.
- ☐ Describe the relationship between the Federal funds rate and the prime interest rate.
- ☐ Describe the actions the Fed can take to pursue a restrictive monetary policy.
- ☐ Explain the Taylor rule and its implications for monetary policy.
- ☐ Draw the demand-for-money and the supply-of-money curves and use them to show how a change in the supply of money will affect the interest rate in the market for money.
- ☐ Draw an investment demand curve to explain the effects of changes in the interest rate on investment spending.
- ☐ Construct an aggregate supply and aggregate demand graph to show how aggregate demand and the equilibrium level of GDP are affected by changes in interest rates and investment spending.
- ☐ Use a cause-effect chain to explain the links between a change in the money supply and a change in the equilibrium level of GDP when there is an expansionary monetary policy and a restrictive monetary policy.
- ☐ List several advantages of monetary policy over fiscal policy.
- ☐ Evaluate recent monetary policy in the United States.
- ☐ Describe two problems or complications of monetary policy.
- ☐ Summarize the key factors and policies affecting aggregate supply and demand, and the level of output, employment, income, and prices in an economy using Figure 33.6.
- ☐ Explain the impact of the mortgage debt crisis (Last Word).

■ CHAPTER OUTLINE

1. The fundamental goal of **monetary policy** is to achieve and maintain price stability, full employment, and economic growth. The Federal Reserve can accomplish this goal by exercising control over the amount of excess reserves held by commercial banks, and thereby influencing the size of the money supply and the total level of spending in the economy.

2. **Interest** is the price paid for the use of money. Although there are many interest rates, the text uses the generic term "interest rate" for the purposes of this chapter. This interest rate is determined by demand and supply in the market for money.

a. Business firms and households wish to hold and, therefore, demand money for two reasons.

(1) Because they use money as a medium of exchange, they have a **transactions demand** for money that is directly related to the nominal gross domestic product (GDP) of the economy.

(2) Because they also use money as a store of value, they have an **asset demand** for money that is inversely related to the rate of interest.

(3) Their **total demand for money** is the sum of the transactions demand and asset demand for money.

b. In the **market for money**, the demand for money and the supply of money determine the equilibrium interest rate. Graphically, the demand for money is a downsloping line and the supply of money is a vertical line, and their intersection determines the equilibrium interest rate.

c. Disequilibrium in this market is corrected by changes in **bond prices** and their inverse relationship with interest rates.

(1) If there is a decrease in the money supply, there will be a shortage of money, so bonds will be sold to obtain money. The increase in supply of bonds will drive down bond prices, causing interest rates to rise until the shortage of money is eliminated.

(2) If there is an increase in the money supply, there will be a surplus of money, so bonds will be bought. The increased demand for bonds will drive up bond prices, causing interest rates to fall until the surplus of money is eliminated.

3. By examining the consolidated **balance sheet** and the principal assets and liabilities of the Federal Reserve Banks, an understanding of the ways the Federal Reserve can control and influence the reserves of commercial banks and the money supply can be obtained.

a. The principal **assets** of the Federal Reserve Banks are U.S. government securities and loans to commercial banks.

b. The principal **liabilities** are Federal Reserve Notes (outstanding), the reserve deposits of commercial banks, and U.S. Treasury deposits.

4. The Federal Reserve Banks use four principal tools (techniques or instruments) to control the reserves of banks and the size of the money supply.

a. The Federal Reserve can *buy or sell government securities* through its **open-market operations** to change the excess reserves of banks and thus the lending ability of the banking system.

(1) Buying government securities in the open market from either banks or the public increases the excess reserves of banks.

(2) Selling government securities in the open market to either banks or the public decreases the excess reserves of banks.

b. The Federal Reserve can *raise or lower the reserve ratio*.

(1) Raising the reserve ratio decreases the excess reserves of banks and the size of the monetary (checkable-deposit) multiplier.

(2) Lowering the reserve ratio increases the excess reserves of banks and the size of the monetary multiplier.

c. The Federal Reserve can *raise or lower the discount rate*. Raising the discount rate discourages banks from borrowing reserves from the Fed. Lowering the discount rate encourages banks to borrow from the Fed.

d. The Federal Reserve can auction off to banks the right to borrow reserves for a set period of time (usually 28 days) through its **term auction facility**. Banks submit bids for the amount of desired reserves and the interest rate they would pay for them. The equilibrium interest rate is the lowest rate that brings the quantity demanded and quantity supplied of reserves into balance. The use of such auctions by the Federal Reserve increases the excess reserves of banks.

e. Of the four main monetary tools, open-market operations is the most important because it is the most flexible and direct.

5. The **Federal funds rate**, the interest rate that banks charge each other for overnight loans of excess reserves, is a focus of monetary policy. The Federal Reserve can influence the Federal funds rate by buying or selling government securities. When the Federal Reserve buys bonds, banks have more excess reserves to lend overnight so the Federal funds rate falls. Conversely, when the Federal Reserve sells bonds, banks have fewer excess reserves to lend overnight so the Federal funds rate rises. A graph of the market for Federal funds has the interest rate on the vertical axis and the quantity of reserves on the horizontal axis. The demand for reserves is a downsloping demand curve. The supply of reserves is a horizontal line at the desired rate because the supply of reserves is set by the Federal Reserve.

a. An **expansionary monetary policy** can be implemented by actions of the Federal Reserve to buy government securities in open-market operations to lower the Federal funds rate. This policy expands the money supply, putting downward pressure on other interest rates, and helps to stimulate aggregate demand. The **prime interest rate** is the benchmark rate that banks use to decide on the interest rate for loans to businesses and individuals; it rises and falls with the Federal funds rate.

b. A **restrictive monetary policy** can be implemented by actions of the Federal Reserve to sell government securities in open-market operations that raises the Federal funds rate. This policy contracts the money supply, putting upward pressure on other interest rates, and helps to reduce aggregate demand to maintain a stable price level.

c. The Federal Reserve does not target inflation or follow a monetary rule, but it does appear to be guided by a rule of thumb called the **Taylor rule**, which specifies conditions for raising and lowering the Federal funds rate based on the current rate of inflation and the relationship between potential and real GDP. For example, when real GDP equals potential GDP and the inflation rate is at its Fed target rate of 2 percent, then the Federal funds rate should be 4 percent (or a 2 percent real rate). If real GDP should rise by 1 percent above potential GDP, the *real* Federal funds rate should increase by half a percentage point. Conversely, if real GDP should fall by 1 percent below potential GDP, the real Federal funds rate should decrease by half a percentage point.

6. Monetary policy affects the **equilibrium GDP** in many ways.

a. The cause-effect chain goes from the money market to investment spending to equilibrium GDP (see text Figure 33.5).

(1) In the market for money, the demand curve for money and the supply curve of money determine the real interest rate.

(2) This rate of interest in turn determines investment spending.

(3) Investment spending then affects aggregate demand and the equilibrium levels of real output and prices.

b. If recession or slow economic growth is a major problem, the Federal Reserve can institute an expansionary monetary policy that increases the money supply, causing the interest rate to fall and investment spending to increase, thereby increasing aggregate demand and increasing real GDP by a multiple of the increase in investment.

c. If inflation is the problem, the Federal Reserve can adopt a restrictive monetary policy that decreases the money supply, causing the interest rate to rise and investment spending to decrease, thereby reducing aggregate demand and controlling inflation.

7. Monetary policy is considered more important and valuable for stabilizing the national economy because of its several advantages over fiscal policy: it is quicker and more flexible; and it is more protected from political pressure.

a. Recent U.S. monetary policy has been expansionary and restrictive in response to concerns about recession and inflation (see Figure 33.4 in the textbook).

(1) In late 2000 to late 2002, the Federal Reserve reduced the Federal funds rate to counter an economic

slowdown and recession during that period. The rate was cut again in 2007 in response to the **mortgage debt crisis** and a term auction facility was initiated in December 2007 to increase the reserves of commercial banks.

(2) To curtail inflation, the Federal funds rate was raised from 1999 to late 2000. The rate was also raised from mid-2004 through mid-2006 to contain expected inflation.

b. There are limitations and real-world complications with monetary policy in spite of its successes over the years.

(1) It is subject to a recognition lag between the time the need for the policy is recognized and also an operations lag that occurs between the time the policy is implemented and it begins to influence economic activity.

(2) There is a **cyclical asymmetry** with monetary policy: A restrictive monetary policy works better than an expansionary monetary policy. A restrictive policy seems to work better because the Federal Reserve can easily withdraw and absorb excess reserves from banks and curtail economic activity. An expansionary policy may not work because even when the Federal Reserve makes more reserves available to banks, the economic conditions of recession or slow growth may make businesses hesitant to increase their borrowing and increase their investment spending.

8. The **"big picture" of macroeconomics** shows that the equilibrium levels of output, employment, income, and prices are determined by the interaction of aggregate supply and aggregate demand.

a. There are four expenditure components of aggregate demand: consumption, investment, government spending, and net export spending.

b. There are three major components of aggregate supply: the prices of inputs or resources, factors affecting the productivity with which resources are used, and the legal and institutional environment.

c. Fiscal, monetary, or other government policies may have an effect on the components of aggregate demand or supply, which in turn will affect the level of output, employment, income, and prices.

9. (Last Word). The **mortgage debt crisis** that began in 2007 required the Federal Reserve to take major actions to increase bank reserves to contain the financial disarray and stabilize the economy. The crisis started from defaults on subprime mortgages that had been packaged as bonds and sold as investments to banks and other financial institutions as creditworthy debt. The defaults produced losses that reduced bank reserves. The Federal Reserve responded to the financial crisis by serving as the lender of last resort for banks and lowering the discount rate, by introducing a term auction facility to auction off more reserves for banks, and by reducing the Federal funds rate. Such actions were designed to increase aggregate demand and help the economy counter an economic slowdown and possible recession.

HINTS AND TIPS

1. Spend extra time learning how the **total demand for money** is determined (see Figure 33.1 in the text). The total demand for money is composed of the transactions and the asset demands for money. The **transactions demand** for money is influenced by the level of nominal GDP and is not affected by the interest rate, so it is *graphed as a vertical line*. The **asset demand** for money is affected by the interest rate, so it is *graphed as a downsloping curve*. The total demand for money is also graphed as a *downsloping curve* because of the influence of the asset demand, but the curve is shifted farther to the right than the asset demand curve because of the influence of the transactions demand.

2. One of the most difficult concepts to understand is the **inverse relationship** between bond prices and interest rates. The simple explanation is that interest yield from a bond is the ratio of the **fixed** annual interest payment to the bond price. The numerator is fixed, but the denominator (bond price) is variable. If the bond price falls, the interest yield on the bond rises because the fixed annual interest payment is being divided by a smaller denominator.

3. To acquire a thorough knowledge of how the Federal Reserve transactions affect required reserves, excess reserves, the actual money supply, and the potential money supply, carefully study the **balance sheets** that are used to explain these transactions. The items to watch are the reserves and checkable deposits. Be sure that you know why a change is made in each balance sheet, and be able to make the appropriate balance-sheet entries as you trace through the effects of each transaction. Problem 2 in this chapter provides additional practice.

4. You must understand and remember the **cause-effect chain of monetary policy**. The best way to learn it is to draw your own chain (graphs) that shows the links for an expansionary monetary policy and for a restrictive monetary policy as in Figure 33.5. Then check each step for how monetary policy can be used to counter recession or limit inflation using Table 33.3 in the text.

5. The single most important figure for a "big picture" of the macroeconomics part of the textbook is Figure 33.6. It reviews and summarizes the determinants of aggregate supply and demand and identifies the key policy variables that have been discussed in this chapter and previous chapters.

IMPORTANT TERMS

monetary policy

transactions demand

asset demand

total demand for money

reserve ratio

discount rate

term auction facility

Federal funds rate

expansionary

monetary policy

prime interest rate

restrictive monetary policy

Taylor rule

cyclical asymmetry

mortgage debt crisis

SELF-TEST

L-IN QUESTIONS

learning how the total demand (see Figure 33.1 in the text) is composed of the transactions demand for money. The transactions demand is determined by the level of nominal GDP and the interest rate, so it is graphed as a downward-sloping curve. The asset demand for money is determined by the level of nominal GDP and the interest rate, so it is graphed as a downward-sloping curve. The total demand for money is the sum of the transactions demand and the asset demand.

so it is graphed as a downward-sloping curve. The transactions demand varies (directly, inversely) with (the rate of interest, nominal GDP) and the asset demand varies (directly, inversely) with (the rate of interest, nominal GDP).

difficult concepts to understand. The goal of monetary policy in the United States is to maintain stability in the (price level, tax level). The sum of the transactions and asset demands for money is the total (demand, supply). If the bond price falls, the quantity of money demanded exceeds the quantity of money supplied, bond prices (increase, decrease) and interest rates (increase, decrease). If the bond price rises, the quantity of money demanded is less than the quantity of money supplied, bond prices (increase, decrease) and interest rates (increase, decrease).

ough knowledge of how the Federal Reserve Banks are (Treasury deposits, government securities, loans to commercial banks). The three major assets of the Federal Reserve Banks are (Treasury deposits, government securities, loans to commercial banks). The three major liabilities of the Federal Reserve Banks are (Treasury deposits, government securities, loans to commercial banks). The three major assets of the Federal Reserve Banks are (Treasury deposits, government securities, loans to commercial banks). The three major liabilities of the Federal Reserve Banks are (Treasury deposits, government securities, loans to commercial banks).

stand and remember the Taylor rule. The best way to understand the Taylor rule is to look at the chain (graphs) that shows the relationship between the monetary policy and for a given level of output. Figure 33.5. Then check the Taylor rule can be used to counteract the effects of a shock. Table 33.3 in the text.

important figure for a "big picture" of the text is Figure 33.1. It identifies the determinants of the money supply and identifies the key policy instruments used in this chapter and the next.

expansionary
monetary policy
prime interest rate
restrictive monetary
Taylor rule
cyclical asymmetry
mortgage debt

four tools the monetary authority uses to control the money supply are (open, closed) operations, changing the (loan, reserve) ratio, changing the (prime interest, discount) rate, and using a term (auction) facility to lend reserves for a set term. The most effective and most often used tool of monetary policy is a change in (the reserve ratio, open-market operations).

When the Federal Reserve Banks buy government securities in the open market, the reserves of commercial banks will (increase, decrease) and they will sell government securities in the open market, the reserves of commercial banks will (increase, decrease).

If the Federal Reserve Banks were to sell \$10 million of government bonds to the public and the reserve

ratio were 25%, the supply of money would immediately be reduced by \$_____. The reserves of commercial banks would be reduced by \$_____. The excess reserves of the banks would be reduced by \$_____. But if these bonds were sold to the commercial banks, the supply of money would immediately be reduced by \$_____. The reserves of the banks would be reduced by \$_____. The excess reserves of the banks would be reduced by \$_____.

9. An increase in the reserve ratio will (increase, decrease) _____ the size of the monetary multiplier and _____ the excess reserves held by commercial banks, thus causing the money supply to (increase, decrease) _____. A decrease in the reserve ratio will (increase, decrease) _____ the size of the monetary multiplier and _____ the excess reserves held by commercial banks, thus causing the money supply to (increase, decrease) _____.

10. If the Federal Reserve Banks were to lower the discount rate, commercial banks would tend to borrow (more, less) _____ from them, and this would (increase, decrease) _____ their excess reserves.

11. A fourth tool the Federal Reserve can use for altering the excess reserves of banks is the (Taylor rule, term auction facility) _____. With this tool, the Federal Reserve specifies the amount of reserves banks can (lend, borrow) _____ for a specific period of time, and then banks submit bids stating the amount of reserves they want and the (exchange, interest) _____ rate they will pay. The rate for all reserves is set at the (lowest, highest) _____ rate bid by a bank that also ensures all available reserves will be taken by the banks.

12. The interest rate that banks charge one another for overnight loans is the (prime interest, Federal funds) _____ rate, but the rate banks use as a benchmark for setting interest rates on loans is the _____ rate. The (prime interest, Federal funds) _____ rate is the focus of the monetary policy of the Federal Reserve.

13. An expansionary monetary policy would be characterized by actions of the Federal Reserve to (increase, decrease) _____ the discount rate, _____ reserve ratios, and (buy, sell) _____ government bonds, whereas a

restrictive monetary policy would include actions taken to (increase, decrease) _____ the discount rate, _____ reserve ratios, and (buy, sell) _____ government bonds.

14. There is a cause-effect chain of monetary policy.

a. In the market for money, the demand for and the supply of money determine the equilibrium rate of (discount, interest) _____.

b. This rate in turn determines the level of (government, investment) _____ spending based on the _____ demand curve.

c. This spending in turn affects aggregate (demand, supply) _____, and the intersection of aggregate supply and demand determines the equilibrium level of real (interest, GDP) _____ and the (discount, price) _____ level.

15. This cause-effect chain can be illustrated with examples.

a. When there is an *increase* in the money supply curve, the real interest rate will (increase, decrease) _____, investment spending will _____, aggregate demand will (increase, decrease) _____, and real GDP will _____.

b. When there is a *decrease* in the money supply curve, the real interest rate will (increase, decrease) _____, investment spending will _____, aggregate demand will (increase, decrease) _____, and real GDP will _____.

16. To eliminate inflationary pressures in the economy, the traditional view holds that the monetary authority should seek to (increase, decrease) _____ the reserves of commercial banks; this would tend to _____ the money supply and to (increase, decrease) _____ the rate of interest, and this in turn would cause investment spending, aggregate demand, and GDP to _____. This action by monetary authorities would be considered (an easy, a tight) _____ money policy.

17. If there were a serious problem with economic growth and unemployment in the economy, the Federal Reserve would typically pursue (an expansionary, a restrictive) _____ monetary policy, in which case the Federal Reserve would (buy, sell) _____ government bonds as a way of (increasing, decreasing)

_____ the money supply, and thereby _____ interest rates; these events would have the effect of (increasing, decreasing) _____ investment spending and thus _____ real GDP.

18. An increase in the money supply will shift the aggregate (supply, demand) _____ curve to the (right, left) _____. A decrease in the money supply will shift the aggregate (supply, demand) _____ curve to the (right, left) _____. If the marginal propensity to consume is .75, then the multiplier will be (3, 4) _____, an initial increase in investment of \$10 billion will (increase, decrease) _____ aggregate demand by (\$30, \$40) _____ billion.

19. Monetary policy has strengths. Compared to fiscal policy, monetary policy is speedier and (more, less) _____ flexible, and _____ isolated from political pressure. Since 1990, the Federal Reserve has been successful in countering recession by (raising, lowering) _____ the Federal funds rate, and it has been successful in limiting inflation by _____ the Federal funds rate.

20. Monetary policy has shortcomings and problems, too. It may be subject to timing (limits, lags) _____ that occur between the time a need is recognized and the policy takes effect. It may be more effective in countering (recession, inflation) _____ than _____.

■ TRUE-FALSE QUESTIONS

Circle *T* if the statement is true, *F* if it is false.

1. The goal of monetary policy is to lower interest rates. T F

2. There is a transactions demand for money because households and business firms use money as a store of value. T F

3. An increase in the price level would increase the transactions demand for money. T F

4. An increase in the nominal GDP, other things remaining the same, will increase both the total demand for money and the equilibrium rate of interest in the economy. T F

5. Bond prices and interest rates are inversely related. T F

6. The securities owned by the Federal Reserve Banks are almost entirely U.S. government bonds. T F

7. If the Federal Reserve Banks buy \$15 in government securities from the public in the open market, the effect will be to increase the excess reserves of commercial banks by \$15. T F

8. When the Federal Reserve sells securities in the open market, the price of these securities falls. T F

9. A change in the reserve ratio will affect the multiple by which the banking system can create money, but it will not affect the actual or excess reserves of member banks. T F

10. An increase in the required reserve ratio will increase the lending capacity of banks. T F

11. If the reserve ratio is lowered, some required reserves are turned into excess reserves. T F

12. When commercial banks borrow from the Federal Reserve Banks at the discount rate, they increase their excess reserves and their money-creating potential. T F

13. The Federal Reserve uses the term auction facility to increase the money supply by auctioning off a specific amount of reserves that banks can borrow for a short time period. T F

14. The least effective and least used tool of monetary policy is the open-market operations, in which government securities are bought and sold. T F

15. The Federal Reserve announces its changes in monetary policy by changing its targets for the Federal funds rate. T F

16. To increase the Federal funds rate, the Federal Reserve buys bonds in the open market to increase the excess reserves of banks. T F

17. The prime interest rate is the rate that banks charge other banks for overnight loans of excess reserves at Federal Reserve banks. T F

18. If the monetary authority wished to follow a restrictive monetary policy, it would sell government securities in the open market. T F

19. The Taylor rule provides a rule of thumb that is used for calculating the target that the Federal Reserve is likely to set for the Federal funds rate. T F

20. In the cause-effect chain, an expansionary monetary policy increases the money supply, decreases the interest rate, increases investment spending, and increases aggregate demand. T F

21. A restrictive monetary policy is designed to correct a problem of high unemployment and sluggish economic growth. T F

22. It is generally agreed that fiscal policy is more effective than monetary policy in controlling the business cycle because fiscal policy is more flexible. T F

23. Monetary policy is subject to more political pressure than fiscal policy. T F

24. Monetary policy is limited by a time lag that occurs from when the problem is recognized to when the policy becomes operational. T F

25. An expansionary monetary policy suffers from a "You can lead a horse to water, but you can't make the horse drink" problem. T F

■ MULTIPLE-CHOICE QUESTIONS

Circle the letter that corresponds to the best answer.

1. The organization directly responsible for monetary policy in the United States is the

- (a) U.S. Treasury
- (b) Federal Reserve
- (c) Internal Revenue Service
- (d) Congress of the United States

2. If the dollars held for transactions purposes are, on the average, spent five times a year for final goods and services, then the quantity of money people will wish to hold for transactions is equal to

- (a) five times the nominal GDP
- (b) 20% of the nominal GDP
- (c) five divided by the nominal GDP
- (d) 20% divided by the nominal GDP

3. There is an asset demand for money because money is

- (a) a store of value
- (b) a measure of value
- (c) a medium of exchange
- (d) a standard of deferred payment

4. An increase in the rate of interest would increase

- (a) the opportunity cost of holding money
- (b) the transactions demand for money
- (c) the asset demand for money
- (d) the prices of bonds

Use the following information and table below to answer Questions 5 and 6. Suppose the transactions demand for money is equal to 10% of the nominal GDP, the supply of money is \$450 billion, and the asset demand for money is that shown in the table.

Interest Rate	Asset demand (billions)
14%	\$100
13	150
12	200
11	250

5. If the nominal GDP is \$3000 billion, the equilibrium interest rate is

- (a) 14%
- (b) 13%
- (c) 12%
- (d) 11%

6. If the nominal GDP remains constant at \$3000 billion an increase in the money supply from \$450 billion to \$500

billion would cause the equilibrium interest rate to

- (a) rise to 14%
- (b) fall to 11%
- (c) fall to 12%
- (d) remain unchanged

7. The total quantity of money demanded is

- (a) directly related to nominal GDP and the rate of interest
- (b) directly related to nominal GDP and inversely related to the rate of interest
- (c) inversely related to nominal GDP and directly related to the rate of interest
- (d) inversely related to nominal GDP and the rate of interest

8. The stock of money is determined by the Federal Reserve System and does not change when the interest rate changes; therefore the

- (a) supply of money curve is downward sloping
- (b) demand for money curve is downward sloping
- (c) supply of money curve is upward sloping
- (d) supply of money curve is vertical

9. Which one of the following points would be true?

- (a) Bond prices and the interest rate are directly related.
- (b) A lower interest rate raises the opportunity cost of holding money.
- (c) The supply of money is directly related to the interest rate.
- (d) The total demand for money is inversely related to the interest rate.

Answer Questions 10 and 11 on the basis of the following information: Bond price = \$10,000; bond fixed annual interest payment = \$1000; bond annual rate of interest = 10%.

10. If the price of this bond decreases by \$2500, the interest rate in effect will

- (a) decrease by 1.1 percentage points
- (b) decrease by 1.9 percentage points
- (c) increase by 2.6 percentage points
- (d) increase by 3.3 percentage points

11. If the price of this bond increases by \$2000, the interest rate in effect will

- (a) decrease by 1.7 percentage points
- (b) decrease by 2.4 percentage points
- (c) increase by 1.1 percentage points
- (d) increase by 2.9 percentage points

12. The largest single asset in the Federal Reserve Banks' consolidated balance sheet is

- (a) securities
- (b) the reserves of commercial banks
- (c) Federal Reserve Notes
- (d) loans to commercial banks

13. The largest single liability of the Federal Reserve Banks is

- (a) securities
- (b) the reserves of commercial banks
- (c) Federal Reserve Notes
- (d) loans to commercial banks

14. Assume that there is a 20% reserve ratio and that the Federal Reserve buys \$100 million worth of government securities. If the securities are purchased from the public, this action has the potential to increase bank lending by a maximum of

- (a) \$500 million, but only by \$400 million if the securities are purchased directly from commercial banks
- (b) \$400 million, but by \$500 million if the securities are purchased directly from commercial banks
- (c) \$500 million, and also by \$500 million if the securities are purchased directly from commercial banks
- (d) \$400 million, and also by \$400 million if the securities are purchased directly from commercial banks

15. Assuming that the Federal Reserve Banks sell \$20 million in government securities to commercial banks and the reserve ratio is 20%, then the effect will be

- (a) to reduce the actual supply of money by \$20 million
- (b) to reduce the actual supply of money by \$4 million
- (c) to reduce the potential money supply by \$20 million
- (d) to reduce the potential money supply by \$100 million

16. Lowering the reserve ratio

- (a) changes required reserves to excess reserves
- (b) increases the amount of excess reserves banks must keep
- (c) increases the discount rate
- (d) decreases the discount rate

17. Commercial bank borrowing from the Federal Reserve

- (a) is not permitted because of the Federal Reserve Act
- (b) is permitted but only for banks that are bankrupt
- (c) decreases the excess reserves of commercial banks and their ability to offer credit
- (d) increases the excess reserves of commercial banks and their ability to offer credit

18. Which is the most important control used by the Federal Reserve to regulate the money supply?

- (a) the reserve ratio
- (b) open-market operations
- (c) the discount rate
- (d) term auction facility

19. The Federal funds rate is the rate that

- (a) banks charge for overnight use of excess reserves held at the Federal Reserve banks
- (b) banks charge for loans to the most creditworthy customers
- (c) the Federal Reserve charges for short-term loans to commercial banks
- (d) is charged for government bonds sold in the open-market operations of the Federal Reserve

20. When the Federal Reserve Banks decide to buy government bonds from banks and the public, the supply of reserves in the Federal funds market

- (a) increases and the Federal funds rate decreases
- (b) decreases and the Federal funds rate decreases
- (c) increases and the Federal funds rate increases
- (d) decreases and the Federal funds rate increases

21. When the Federal Reserve uses open-market operations to reduce the Federal funds rate several times over a year it is pursuing

- (a) an expansionary monetary policy
- (b) a restrictive monetary policy
- (c) a prime interest rate policy
- (d) a discretionary fiscal policy

22. The economy is experiencing high unemployment and a low rate of economic growth and the Fed decides to pursue an expansionary monetary policy. Which set of actions by the Fed would be most consistent with this policy?

- (a) buying government securities and raising the reserve ratio
- (b) selling government securities and raising the discount rate
- (c) buying government securities and lowering the reserve ratio
- (d) selling government securities and lowering the discount rate

23. The economy is experiencing inflation and the Federal Reserve decides to pursue a restrictive monetary policy. Which set of actions by the Fed would be most consistent with this policy?

- (a) buying government securities and lowering the discount rate
- (b) buying government securities and lowering the reserve ratio
- (c) selling government securities and raising the discount rate
- (d) selling government securities and lowering the discount rate

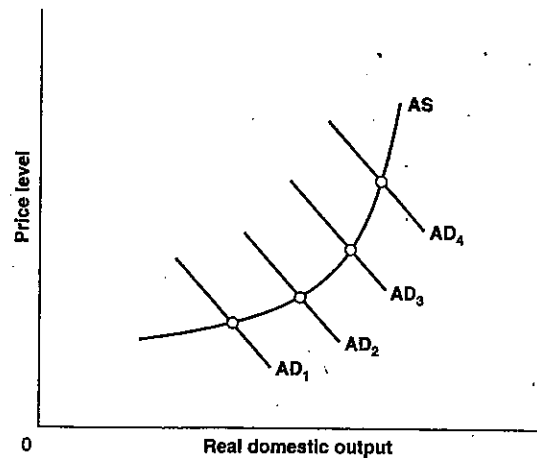
24. In the chain of cause and effect between changes in the excess reserves of commercial banks and the resulting changes in output and employment in the economy,

- (a) an increase in excess reserves will decrease the money supply
- (b) a decrease in the money supply will increase the rate of interest
- (c) an increase in the rate of interest will increase aggregate demand
- (d) an increase in aggregate demand will decrease output and employment

25. Which is most likely to be affected by changes in the rate of interest?

- (a) tax rates
- (b) investment spending
- (c) government spending
- (d) the imports of the economy

Use the following graph to answer Questions 26 and 27.



26. A shift from AD_1 to AD_2 would be most consistent with

- (a) an increase in the reserve ratio by the Federal Reserve
- (b) an increase in the discount rate by the Federal Reserve
- (c) the buying of securities by the Federal Reserve
- (d) the selling of securities by the Federal Reserve

27. Assume that the Federal Reserve lowers interest rates to increase investment spending. This monetary policy is most likely to shift

- (a) AD_3 to AD_2
- (b) AD_3 to AD_4
- (c) AD_4 to AD_3
- (d) AD_2 to AD_1

28. A restrictive monetary policy would be most consistent with

- (a) a decrease in the Federal funds rate and a decrease in the money supply
- (b) a decrease in the Federal funds rate and an increase in the money supply
- (c) an increase in the Federal funds rate and a decrease in the money supply
- (d) an increase in the Federal funds rate and an increase in the money supply

29. Assume that monetary policy increases interest rates and results in a decrease in investment spending of \$5 billion. If the marginal propensity to consume is .80, then aggregate demand is most likely to

- (a) increase by \$5 billion
- (b) decrease by \$5 billion
- (c) increase by \$25 billion
- (d) decrease by \$25 billion

30. Assume the Fed creates excess reserves, but the policy does not encourage banks to make loans and thus increase the money supply. This situation is a problem of

- (a) a restrictive monetary policy
- (b) cyclical asymmetry
- (c) using a Taylor rule
- (d) targeting the Federal funds rate

■ PROBLEMS

1. The total demand for money is equal to the transactions demand plus the asset demand for money.

a. Assume each dollar held for transactions purposes is spent (on the average) four times per year to buy final goods and services.

(1) This means that transactions demand for money will be equal to (what fraction or percent) _____ of the nominal GDP, and,

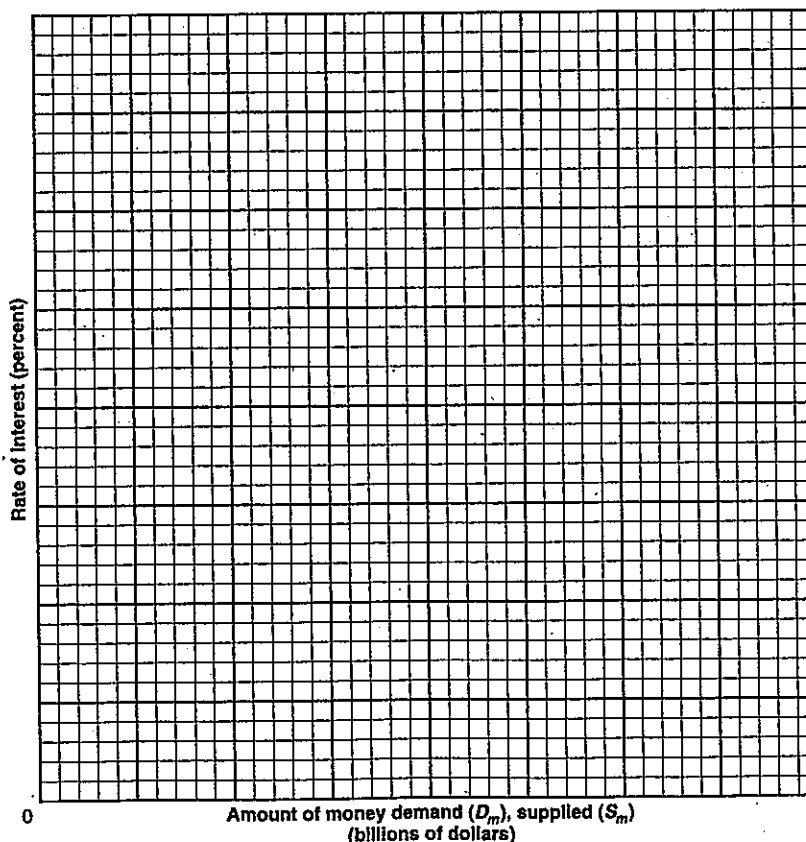
(2) if the nominal GDP is \$2000 billion, the transactions demand will be \$ _____ billion.

b. The following table shows the number of dollars demanded for asset purposes at each rate of interest.

(1) Given the transactions demand for money in (a), complete the table.

Interest rate	Amount of money demanded (billions)	
	For asset purposes	Total
16%	\$ 20	\$ _____
14	40	_____
12	60	_____
10	80	_____
8	100	_____
6	120	_____
4	140	_____

(2) On the following graph, plot the total demand for money (D_m) at each rate of interest.



c. Assume the money supply (S_m) is \$580 billion.

(1) Plot this money supply on the graph.

(2) Using either the graph or the table, the equilibrium rate of interest is _____ %.

d. Should the money supply

(1) increase to \$600 billion, the equilibrium interest rate would (rise, fall) _____ to _____ %.

(2) decrease to \$540 billion, the equilibrium interest rate would _____ to _____ %.

e. If the nominal GDP

(1) increased by \$80 billion, the total demand for money would (increase, decrease) _____

by \$ _____ billion at each rate of interest, and the equilibrium rate of interest would (rise, fall) _____ by _____ %.

(2) decreased by \$120 billion, the total demand for money would _____ by \$ _____

_____ billion at each rate of interest and the equilibrium interest rate would _____ by _____ %.

2. Suppose a bond with no expiration date pays a fixed \$500 annually and sells for its face value of \$5000.

a. Complete the table at the top of the next column and calculate the interest rate (to one decimal place) that would be obtained from the bond when the bond price is given or calculate the bond price when the interest rate is given.

Bond price	Interest rate
\$4000	_____ %
\$_____	11.0
\$5000	_____
\$5500	_____
\$_____	8.0

b. Based on the results of the table, as the price increases on a bond with a fixed annual payment, the interest yield on the bond (decreases, increases) _____, but when the price of a bond decreases, the interest yield _____. Given this situation in an economy, you can conclude that a higher price for bonds (increases, decreases) _____ interest rates and that a lower price for bonds _____ interest rates.

3. Assume that the following consolidated balance sheet is for all commercial banks. Assume also that the required reserve ratio is 25% and that cash is *not* a part of the commercial banks' legal reserve.

Assets		Liabilities	
Cash	\$ 50	Checkable deposits	\$400
Reserves	100	Loans from Federal Reserve	25
Loans	150	Net worth	75
Securities	200		
	\$ 500		\$500

a. To *increase* the supply of money by \$100, the Fed could (buy, sell) _____ securities worth \$_____ in the open market.
b. To *decrease* the supply of money by \$50, the Fed could (buy, sell) _____ securities worth \$_____ in the open market.

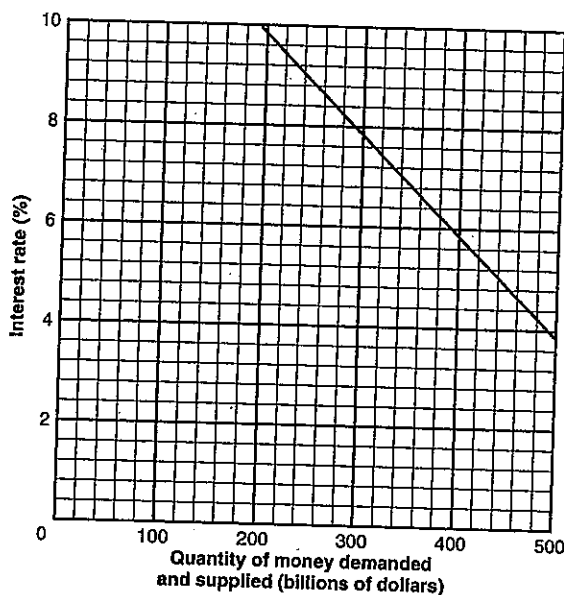
4. At the bottom of the page are the consolidated balance sheets of the Federal Reserve and of the commercial banks. Assume that the reserve ratio for commercial banks is 25%, that cash is *not* a part of a bank's legal reserve, and that the figures in column 1 show the balance sheets of the Federal Reserve and the commercial banks *prior to each of the following five transactions*. Place the new balance sheet figures in the appropriate columns and complete A, B, C, D, and E in these columns. Do *not* use the figures you place in columns 2 through 5 when you work the next part of the problem; start all parts of the problem with the printed figures in column 1.

- The Federal Reserve Banks sell \$3 in securities to the public, which pays by check (column 2).
- The Federal Reserve Banks buy \$4 in securities from the commercial banks (column 3).
- The Federal Reserve Banks lower the required reserve ratio for commercial banks to 20% (column 4).
- The U.S. Treasury buys \$5 worth of goods from U.S. manufacturers and pays the manufacturers by checks drawn on its accounts at the Federal Reserve Banks (column 5).

	(1)	(2)	(3)	(4)	(5)	(6)
Federal Reserve Banks						
Assets:						
Gold certificates	\$ 25	\$_____	\$_____	\$_____	\$_____	\$_____
Securities	30	_____	_____	_____	_____	_____
Loans to commercial banks	10	_____	_____	_____	_____	_____
Liabilities:						
Reserves of commercial banks	200	_____	_____	_____	_____	_____
Treasury deposits	5	_____	_____	_____	_____	_____
Federal Reserve Notes	10	_____	_____	_____	_____	_____
Commercial Banks						
Assets:						
Reserves	\$ 50	\$_____	\$_____	\$_____	\$_____	\$_____
Securities	70	_____	_____	_____	_____	_____
Loans	90	_____	_____	_____	_____	_____
Liabilities:						
Checkable deposits	200	_____	_____	_____	_____	_____
Loans from Federal Reserve	10	_____	_____	_____	_____	_____
A. Required reserves		_____	_____	_____	_____	_____
B. Excess reserves		_____	_____	_____	_____	_____
C. How much has the money supply changed?		_____	_____	_____	_____	_____
D. How much more can the money supply change?		_____	_____	_____	_____	_____
E. What is the total of C and D?		_____	_____	_____	_____	_____

e. Because the Federal Reserve Banks have raised the discount rate, commercial banks repay \$6 which they owe to the Federal Reserve (column 6).

5. On the following graph is the demand-for-money curve that shows the amounts of money consumers and firms wish to hold at various rates of interest (when the nominal GDP in the economy is given).

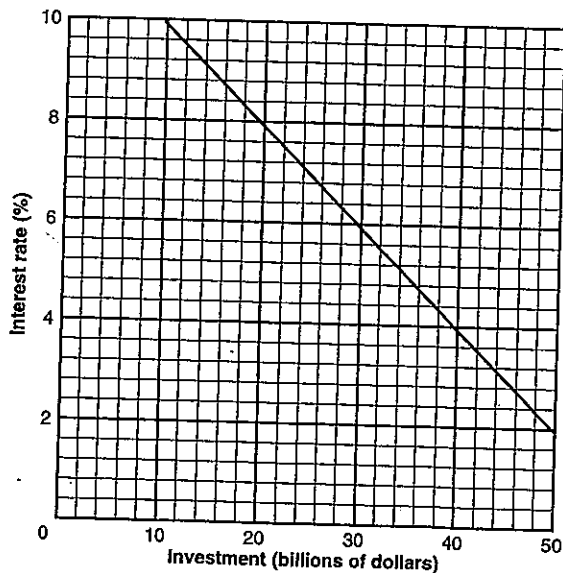


a. Suppose the supply of money is equal to \$300 billion.

(1) Draw the supply-of-money curve on the above graph.

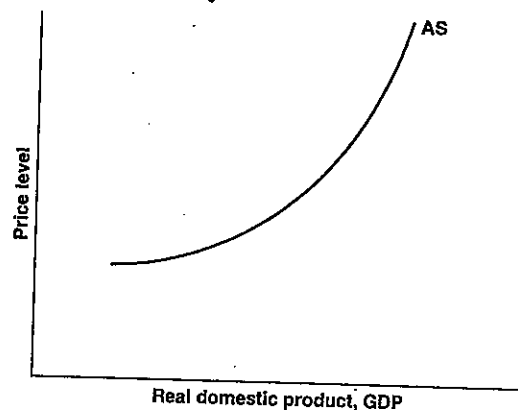
(2) The equilibrium rate of interest in the economy is _____%.

b. Below is a graph of an investment demand curve which shows the amounts of planned investment at various rates of interest.



Given your answer to (2) above, how much will investors plan to spend for capital goods?
\$ _____ billion.

c. The following figure shows the aggregate supply (AS) curve in this economy. On the graph, draw an aggregate demand curve (AD_1) so that it crosses the AS in the middle of the curve. Label the price level (P_1) and output level (Q_1) associated with the intersection of AD_1 and AS.



d. Now assume that monetary authorities increase the money supply to \$400.

(1) On the market for money graph, plot the new money supply curve. The new equilibrium interest rate is _____%.

(2) On the investment graph, determine the level of investment spending that is associated with this new interest rate: \$ _____ billion. By how much has investment spending increased as a result of the change in the interest rate? \$ _____ billion.

(3) Assume that the marginal propensity to consume is .75. What is the multiplier? _____. By how much will the new investment spending increase aggregate demand? \$ _____ billion.

(4) On the previous figure, indicate how the change in investment spending affects aggregate demand. Draw a new aggregate demand curve (AD_2) so that it crosses the AS curve. Also label the new price level (P_2) and output level (Q_2) associated with the intersection of AD_2 and AS.

6. Columns 1 and 2 of the following table show the aggregate supply schedule. (The price level is a price index, and real domestic output is measured in billions of dollars.)

(1) Price level	(2) Real output	(3) AD_1	(4) AD_2
110	1600	1800	_____
120	1700	1700	_____
130	1790	1600	_____
140	1800	1500	_____
150	1940	1400	_____
160	2000	1300	_____

- a. If the aggregate demand schedule were that shown in columns 1 and 3, the equilibrium real domestic output would be \$_____ billion and the price level would be _____.
- b. Now assume that the Federal Reserve took actions to lower the Federal funds rate, and these actions increased investment spending in this economy by \$60 billion. Also assume that the marginal propensity to consume in the economy was .8. How much would aggregate demand increase? \$_____ billion
- c. In column 4, enter this amount of increase in real domestic output at each price level to define the new AD schedule (AD_2).
- d. What is the new equilibrium real domestic output? \$_____ billion. And the new price level? _____.

■ SHORT ANSWER AND ESSAY QUESTIONS

1. What is the basic goal of monetary policy?
2. What are the two reasons people wish to hold money? How are these two reasons related to the functions of money?
3. Explain the determinant of each of the two demands for money and how a change in the size of these determinants will affect the amount of money people wish to hold.
4. The rate of interest is a price. Of what good or service is it the price? Explain how demand and supply determine this price.
5. Describe how changes in bond prices correct disequilibrium in the market for money. What is the relationship between bond prices and interest rates?
6. What are the important assets and liabilities of the Federal Reserve Banks?
7. Explain how the four monetary policy tools of the Federal Reserve Banks would be used to contract the supply of money. How would they be used to expand the supply of money?
8. What is the difference between the effects of the Federal Reserve's buying (selling) government securities in the open market from (to) commercial banks and from (to) the public?
9. Which of the monetary policy tools available to the Federal Reserve is most effective? Why is it more important than other tools?
10. What happens to the Federal funds rate when the Federal Reserve expands or contracts the money supply through open-market operations?
11. What are the characteristics of an expansionary monetary policy? How does the Federal Reserve implement such policies?

12. What are the characteristics of a restrictive monetary policy? How does the Federal Reserve implement such policies?

13. What is the Taylor rule and how is it used?

14. Using four graphs, explain what determines (a) the equilibrium interest rate, (b) investment spending, and (c) the equilibrium GDP. Now use these four graphs to show the effects of a decrease in the money supply upon the equilibrium GDP.

15. Why are changes in the rate of interest more likely to affect investment spending than consumption and saving?

16. What policies will the Federal Reserve use to counter inflation, or unemployment and recession? Describe the effects on bank reserves, the money supply, interest rates, investment spending, aggregate demand, and real GDP from each policy.

17. What are the major strengths of monetary policy?

18. Discuss how monetary policy has been used to counter recession and limit inflation since the 1990s.

19. How do lags affect monetary policy?

20. What is meant by cyclical asymmetry and how does it apply to monetary policy?

ANSWERS

Chapter 33 Interest Rates and Monetary Policy

FILL-IN QUESTIONS

1. price level, full
2. directly, nominal GDP, inversely, the rate of interest
3. demand, supply, interest rate
4. decrease, increase, increase, decrease
5. government securities, loans to, Treasury deposits, reserves of, Federal Reserve Notes
6. open, reserve, discount, auction, open-market operations
7. increase, decrease
8. 10 million, 10 million, 7.5 million, 0, 10 million, 10 million
9. decrease, decrease, decrease, increase, increase, increase
10. more, increase
11. term auction facility, borrow, interest, lowest
12. Federal funds, prime interest, Federal funds
13. decrease, decrease, buy, increase, increase, sell
14. a. interest; b. investment, investment; c. demand, GDP, price
15. a. decrease, increase, increase, increase; b. increase, decrease, decrease, decrease
16. decrease, decrease, increase, decrease, a tight
17. an expansionary, buy, increasing, decreasing, increasing, increasing
18. demand, right, demand, left, 4, increase, \$40
19. more, more, lowering, raising
20. lags, inflation, recession

TRUE-FALSE QUESTIONS

1. F, p. 660
2. F, p. 661
3. T, p. 661
4. T, pp. 661–663
5. T, p. 663
6. T, p. 664
7. F, p. 665
8. T, p. 667
9. F, pp. 667–668
10. F, pp. 667–668
11. T, p. 667
12. T, pp. 668–669
13. T, p. 669
14. F, pp. 669–670
15. T, p. 670
16. F, pp. 670–671
17. F, pp. 671–672
18. T, p. 672
19. T, pp. 672–673
20. T, pp. 674–676
21. F, pp. 676–678
22. F, p. 678
23. F, p. 678
24. T, p. 679
25. T, pp. 679, 682

PROBLEMS

1. a. (1) $1/4$ (25%), (2) 500; b. (1) 520, 540, 560, 580, 600, 620, 640; (2) see Figure 33.1 in the text for an example c. (1) see Figure 33.1 in the text for an example (2) 10; d. (1) fall, 8 (2) rise, 14; e. (1) increase, 20, rise, 2, (2) decrease, 30, fall, 3
2. a. 12.5%, \$4,545, 10.0%, 9.1%, \$6,250; b. decreases increases, decreases, increases
3. a. buy, 25; b. sell, 12 $1/2$
4. See below
5. a. (2) 8; b. 20; c. see Figure 33.5 in text; d. (1) 6, (2) 30, 10 (3) 4, 40, (4) see Figure 33.5 in text
6. a. 1700, 120; b. 300 (multiplier of $5 \times \$60$ billion = \$300 billion); c. 2100, 2000, 1900, 1800, 1700, 1600; d. 1800, 140

MULTIPLE-CHOICE QUESTIONS

1. b, p. 660
2. b, p. 661
3. a, p. 661
4. a, p. 661
5. b, pp. 661–663
6. c, pp. 661–663
7. b, pp. 661–663
8. d, pp. 663, 674
9. d, p. 663
10. d, p. 663
11. a, p. 663
12. a, p. 664
13. c, p. 664
14. b, pp. 665–666
15. d, pp. 666–667
16. a, p. 667
17. d, p. 668
18. b, pp. 669–670
19. a, p. 670
20. a, p. 671
21. a, pp. 671–672
22. c, pp. 671, 676–677
23. c, pp. 672, 677–678
24. b, pp. 674–675
25. b, pp. 675–676
26. c, pp. 676–677
27. b, pp. 676–677
28. c, p. 677
29. d, p. 677
30. b, p. 679

SHORT ANSWER AND ESSAY QUESTIONS

1. p. 660
2. p. 661
3. p. 661
4. pp. 662–663
5. p. 663
6. p. 664
7. pp. 666–669
8. pp. 665–667
9. pp. 669–670
10. pp. 670–671
11. pp. 671–672
12. p. 672
13. p. 673
14. pp. 674–677
15. pp. 675–676
16. pp. 676–678
17. p. 678
18. pp. 678–679
19. pp. 679
20. pp. 679, 682

	(2)	(3)	(4)	(5)	(6)
Federal Reserve Banks					
Assets:					
Gold certificates	\$ 25	\$ 25	\$ 25	\$ 25	\$ 25
Securities	27	34	30	30	30
Loans to commercial banks	10	10	10	10	4
Liabilities:					
Reserves of commercial banks	47	54	50	55	44
Treasury deposits	5	5	5	0	5
Federal Reserve Notes	10	10	10	10	10
Commercial Banks					
Assets:					
Reserves	\$ 47	\$ 54	\$ 50	\$ 55	\$ 44
Securities	70	66	70	70	70
Loans	90	90	90	90	90
Liabilities:					
Checkable deposits	197	200	200	205	200
Loans from Federal Reserve	10	10	10	10	4
A. Required reserves	49.25	50	40	51.25	50
B. Excess reserves	-2.25	4	10	3.75	-6
C. How much has the money supply changed?	-3	0	0	+5	0
D. How much more can the money supply change?	-9	+16	+50	+15	-24
E. What is the total of C and D?	-12	+16	+50	+20	-24